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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,934	11/04/2003	Yingyin Zou	BATI-PA03-001	5929
7590	10/20/2005		EXAMINER	
Yingyin Zou 4 Fairbank Road Lexington, MA 02421			LANE, JEFFREY D	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/700,934	Applicant(s) ZOU ET AL.	
	Examiner Jeffrey D. Lane	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/04/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-8, 10 and 11 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 5 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/04/2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/04/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

Information Disclosure Statement

1. The information disclosure statement filed 11/04/2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Applicant needs to submit a copy of non-patent literature to the office to be considered.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 113 is labeled in the drawings but is not found in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

For examination purposes "113" will be interpreted as "112" listed in the specification.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the PMN-PT Q-switch having an optical axis 45° from the optical axis and the polarizer mounted 45° to the optical axis, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities: On page 8 line 15 it reads "...have zero voltage level while cross the zero line 310 in FIG. 3A." which is grammatically incorrect. For examination purposes it is interpreted as "... have zero voltage level while it crosses the zero line 310 in FIG. 3A."

Appropriate correction is required.

Claim Objections

5. Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 2 does not further limit claim 1 because quadratic electro-optic Q-Switch inherently has a quadratic electro-optic coefficient.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1,2,6,7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pao et al. (US 3,842,372) in view of Kung et al.

As for claim 1, Pao discloses in Figure 5, A Q-switch laser apparatus to deliver a sequence of laser pulses (fig 6a) comprising: a laser cavity formed by a pair of reflective surfaces 66 and 68; a laser gain medium 62 mounted in said laser cavity; a quadratic electro-optic Q-switch 60 (see abstract lines 1-2) mounted in said laser cavity; said Q-switch 60 being connected with an electronic unit generating a radio frequency wave with positive and negative pulses alternatively (see fig 6a); and said Q-switch 60 being controlled by the radio frequency wave in such a way that laser pulse is generated when the radio frequency wave changes its polarity (see fig 6b). Pao does not disclose using optic coupling elements. Kung discloses using a lens, optical coupling elements, to focus the light to the center of the gain medium (see column 4 lines 13-16). Therefore it would have been obvious to one of ordinary skill in the art to add an optic coupling element, to focus the light through the gain medium of the Q-switch laser apparatus.

As for claim 2, Pao discloses an electro-optic q-switch 60 having an electro-optic coefficient.

As for claim 6, Pao implies that the stark field is 1 cm and discloses that 240 volts/cm is necessary to operate the Q-Switch (See column 7 lines 17-20). Therefore Pao describes a device that will have an operable Q-Switch of 500 volts or less.

As for claim 7, Pao discloses that the device is with a controlling frequency of 0.5 MHz. (see column 3 line 43). Which would translate to a pulse repetition frequency of 1 MHz.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pao and Kung as applied to claim 1 above, and further in view of Aitken et al (US 6,268,303).

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Pao and Kung disclose all that pertains to claim 1 as stated above. They however do not disclose the use of ceramics for Q-Switching. Aitken discloses "Transparent glass ceramics which exhibit ferro-electric properties are desirable for their use in electro-optical devices of the type disclosed in U.S. Pat. No. 3,069,973 to Ames and U.S. Pat. No. 3,467,463 to Borrelli et al., and acousto-optical devices such as, for example, modulators, laser Q-switches, and/or deflectors. Glass ceramics with sufficiently high dielectric properties at room temperature are also useful in electrical devices such as capacitors, electro-luminescent cells, etc. " (Column 1 lines 56-64). Therefore it would have been obvious to one of ordinary skill in the art to use a ceramic electro-optic for a Q-Switch in Pao's Q-Switch laser apparatus for its ferro-electric properties.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pao and Kung as applied to claim 1 above, and further in view of Schreiner (US 2003/0058552). Pao and Kung disclose all that pertains to claim 1 however they do not disclose using a laser wavelength between 530nm to 3µm. Schreiner discloses, "However, those skilled in the art will recognize that other solid-state lasants or even gas, semiconductor or tunable organic dye lasants could be used in the lasers 12. For example, suitable gas lasants and their fundamental wavelengths could include ... Krypton (350.7-799.3 nm)... " (see paragraph [0019]) Therefore it would have been obvious to one of ordinary skill in the art to select a Krypton laser, as disclosed by Schreiner, with fundamental wavelength frequency of 350.7-799.3 nm, for the Q-switching laser apparatus, as disclosed by Pao and Kung, to make it tunable.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pao and Kung as applied to claim 1 above, and further in view of Gregor et al. (US 5,963,574).

Pao and Kung disclose all that pertains to claim 1 but does not disclose using a polarizing element. Gregor discloses, in figure 4, a polarizer 63 mounted at a 45° to the optical axis 69 of the Q-Switch 65. Gregor further explains, "The polarizer 63 splits off or directs a portion of the laser energy out of the resonator 70 to provide the output beam 73. "

(Column 3 lines 40-43). Therefore it would have been obvious to one of ordinary skill in the art to use a polarizer mounted at 45° to the optical access of the Q-Switch in Pao's Q-Switch laser apparatus to provide an output beam, as taught by Gregor.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pao and Kung as applied to claim 1 above, and further in view of Zenzie et al. (US 5,345,457).

Pao and Kung disclose all that pertain to claim 1, however Pao and Kung do not disclose using a frequency doubling crystal. Zenzie discloses, "The two laser elements may be made of the same material, for example, solid state lasers made of Nd:YAG; or they may be different materials. For example, one may be Nd:YAG and another one may be Nd:YLF. Or they may be different types of lasers: one may be solid state and the other one a gas laser.

Whatever the two lasers are, when their outputs are combined and sent to a nonlinear-mixing element, they will produce an output beam whose wavelength is a function of the combined energies of the two input beams." (Column 3 lines 19-26). Zenzie further discloses that KTP is a nonlinear mixing element (see column 3 lines 42-47). Therefore it would have been obvious to one of ordinary skill in the art to use a KTP crystal to double the frequency of the output of Pao's Q-Switch laser apparatus.

Allowable Subject Matter

12. Claims 4, 5, and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: There is nothing found in the references cited that teaches using La modified PMNT-PT material as a Q-Switch as claimed in claims 4, 5, and 9.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey D. Lane whose telephone number is (571) 272-1676. The examiner can normally be reached on Monday thru Friday 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrey D Lane
Examiner
Art Unit 2828

JDL